IN THE CLAIMS

The claims set forth in the following listing of claims replace all previous versions, and listings, of claims in this application:

1. (Currently Amended) A chip transfer apparatus for transferring chips onto works, the apparatus comprising:

a first carrier ~~for carrying~~ configured to carry chips thereon;

a second carrier ~~for carrying~~ configured to carry works thereon;

a plurality of end-effectors ~~receiving~~ configured to receive chips from said first carrier and ~~transferring~~ to transfer the chips onto the works carried by the second carrier;

a first plurality of coaxial revolvers, each of which has ~~said~~ one ~~end effector~~ of said end-effectors, ~~and can~~ each of the coaxial revolvers configured to revolve around one common axis independently; and

a plurality of servo drives, each ~~of which drives each~~ configured to drive a respective one of said coaxial revolvers ~~to~~ independently and ~~randomly~~ to change a periodic revolving speed and phase of ~~each~~ the respective coaxial revolver[[;]].

wherein each of said end-effectors is ~~inseparably mounted on each~~ affixed to a respective one of said coaxial revolvers and distributed in one common circle around said one common axis,

wherein each of said end-effectors~~ moves sequentially keeping their~~ rotates in sequential order in a periodic motion by the action of said servo drives, and~~, at substantially zero speed relative to the second carrier work on said second carrier the to transfer said received chip onto movementsynchronized with said second carrierand is ,~~

~~at substantially zero speed relative to said first carrier to receive a chip from said first carrier movementsynchronized with said first carrierand is~~

~~and is independently changed its~~ wherein a respective revolving speed and phase of each of the end-effectors is independently changed during the periodic motion, the periodic motion including said receiving motion and transferring motion.

2. (Currently Amended) The transfer apparatus according to claim 1, further comprising:

a rigid frame;

a first plurality of coaxial bearings including a first coaxial bearing through a last coaxial bearing, each of the coaxial bearings respectively including an inner race and an outer race, the outer race of the first coaxial bearing and the inner race of the last coaxial bearing being affixed to the rigid frame,

wherein each of said coaxial revolvers includes a respective one of the first through a next-to-last one of the coaxial ~~bearing~~ bearings arranged in sequential order in the axial direction ~~having~~, and

~~an~~ wherein the inner race of each of the first through the next-to-last one of the coaxial bearings is fixed to ~~an~~ the outer race of ~~the coaxially~~ an adjacent coaxial bearing, ~~the inner race of the bearing on one end side being fixed to an outer race of an additional bearing which inner race is fixed to one fixed side and the outer race of the bearing on the other end side being fixed to the other fixed side;~~

~~coaxially adjacent another bearing; an inner race of the having an outer race fixed to and~~

each of said end-effectors being ~~inseparably fixed~~ fixed via a corresponding coaxial revolver to the inner race of ~~the~~ an associated coaxial bearing, and the outer race of the associated coaxial bearing being activated by a rotational driving force of ~~each~~ a corresponding one of said servo drives.

3. (Currently Amended) The transfer apparatus ~~of~~ according to claim 1, wherein each of the ~~coaxial revolvers~~ servo drives is configured to individually and independently ~~made its~~ change the periodic revolving speed ~~change~~ and phase

control ~~by the operation of the associated servo drive~~ of a respective one of the coaxial revolvers.

4. (Currently Amended) The transfer apparatus according to claim 3, further comprising:

a measuring unit ~~speed for measuring the~~ configured to measure a position of the chip carried on the first carrier and/or ~~speed the~~ a position of the work carried on the second carrier[[;]],

wherein the servo drives ~~being operated~~ operates based on ~~the basis of~~ the ~~measurement result of~~ position measured by the measuring unit.

5. (Currently Amended) The transfer apparatus according to claim 3, wherein, even ~~if~~ when the first and second carriers move in a forward direction at different speeds, each of the end-effectors receives a chip from the first carrier at substantially zero speed in the forward direction relative to the first carrier synchronized with the first carrier movement, and transfers the received chip onto a predetermined position of the work on the second carrier at substantially zero speed in the forward direction relative to the second carrier synchronized with the second carrier movement.

6. (Currently Amended) The transfer apparatus according to claim 5, wherein each of the first and second carriers is a rotating cylinder or a conveyor belt.

7. (Currently Amended) The transfer apparatus according to claim 1, wherein the chips are electronic parts, and

wherein the works are IC card parts or RF tag parts in the form of sheets.

8. (New) The transfer apparatus according to claim 1, wherein each end-effector is further configured to receive the chip from the first carrier in synchronization with the first carrier such that the end-effector has substantially zero speed with respect to the chip in a forward direction in which the first carrier conveys the chip when the end-effector receives the chip, and

wherein each end-effector is further configured to transfer the chip onto a work conveyed by the second carrier in synchronization with the second carrier such that the end-effector has substantially zero speed with respect to the work in a second direction in which the second carrier conveys the work when the end-effector transfers the chip onto the work.

9. (New) The transfer apparatus according to claim 1, wherein the end-effectors include a pneumatic mechanism.

10. (New) The transfer apparatus according to claim 1, further comprising:

a second plurality of coaxial revolvers opposite the first plurality of coaxial revolvers, and

a second plurality of servo drives configured to rotate the second plurality of coaxial revolvers about the one common axis,

wherein each of the second plurality of coaxial revolvers is distributed around the one common circle alternatingly with adjacent ones of the first plurality of coaxial revolvers.

11. (New) The transfer apparatus according to claim 4, wherein the measuring unit includes a camera.

12. (New) The transfer apparatus according to claim 1, further comprising:

a controller configured to receive input from the measuring unit and to control the plurality of servo drives.

13. (New) The transfer apparatus according to claim 2, further comprising:

a shaft disposed along the one common axis; and

a second plurality of coaxial bearings, each respectively including an inner race affixed to the shaft and an outer race affixed to one of the end-effectors.

14. (New) The transfer apparatus according to claim 1, wherein the servo drives each respectively include a motor operatively connected to a drive wheel, and

wherein each drive wheel is operatively connected to an outer race of the first plurality of bearings not fixed to the rigid frame.

15. (New) A method for applying chips to works, comprising:

conveying a plurality of chips in a first direction at a first speed;

conveying a plurality of works in a second direction at a second speed;

measuring positions of the chips conveyed at the first speed and the works conveyed at the second speed;

independently rotating each of a plurality of end-effectors distributed in sequential order around one common circle;

changing a respective periodic revolving speed and phase of each of the end-effectors individually based on the measured positions of the chips and works; and synchronizing each of the end-effectors to receive a chip conveyed at the first speed and to transfer the chip to a work conveyed at the second speed.

16. (New) The method according to claim 15, wherein the synchronizing each of the end-effectors includes:

adjusting a rotating speed of each of the end-effectors to match the first speed when receiving a chip such that there is zero speed difference between the end-effector and the chip in the first direction; and

adjusting a rotating speed of each of the end-effectors to match the second speed when transferring the received chip onto a predetermined position of a work such that there is zero speed difference between the end-effector and the work in the second direction.

17. (New) The method according to claim 15, further comprising:

applying suction when receiving the chip; and

releasing the suction when transferring the chip onto the work.

18. (New) A method for controlling a manufacturing apparatus for applying chips to works, comprising:

controlling a first carrier to convey a plurality of chips along a first path at a first speed;

controlling a second carrier to convey a plurality of works along a second path at a second speed;

receiving a measurement of a respective position of one of the chips and one of the works from a respective sensor;

independently rotating each of a plurality of coaxial revolvers distributed in sequential order around one common circle;

controlling a plurality of servo drives to change a respective periodic revolving speed and phase of each of the coaxial revolvers individually based on the measurement of the positions received from the respective sensors; and

synchronizing each of a plurality of end-effectors disposed on the coaxial revolvers to receive a chip from the first carrier and to transfer the chip onto a work conveyed by the second carrier.

19. (New) The method according to claim 18, wherein the synchronizing each of the end-effectors includes:

controlling a rotating speed and phase of each of the end-effectors to match the first speed when receiving a chip from the first carrier such that there is zero speed difference between the end-effector and the chip in the direction of the first path; and

controlling a rotating speed and phase of each of the end-effectors to match the second speed when transferring the received chip onto a predetermined position of the work on the second carrier such that there is zero speed difference between the end-effector and the work in the direction of the second path.

20. (New) The method according to claim 18, further comprising:

controlling a pneumatic system to apply suction when receiving the chip; and

controlling the pneumatic system to release the suction when transferring the chip onto the work.